

Notice of Allowability

Application No.

10/813,696

Examiner

Paul A. Zucker

Applicant(s)

CHAUDHARI ET AL.

Art Unit

1621

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to Applicants amendment and remarks of 3/29/2007.
2. ☒ The allowed claim(s) is/are 1-22.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some* c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date 20070607.
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

PAUL A. ZUCKER, PH.D.
PRIMARY EXAMINER

AO 1621

DETAILED ACTION

Allowable Subject Matter

1. The following is an examiner's statement of reasons for allowance: The instantly claimed process for preparing the esters of γ -hydroxy tiglic aldehydes is neither disclosed nor fairly suggested by the closest prior art: Fitton et al (US 4,124,619 11-1978) and El Ali et al (Abstracts of Papers 224th ACS National Meeting, Boston, MA, Hydroformylation and Acetalization of Styrene Derivatives Catalyzed by Rh(III)-phosphite and Rh(III) Supported on MCM-41-phosphite Systems, 2002). Applicants have persuasively argued (Remarks, page 8, 1st full paragraph – end of paragraph bridging pages 8 and 9) that one of ordinary skill in the art would not have been motivated to substitute El Ali's catalyst which is employed in the hydroformylation of styrene derivatives in Fitton's process with a reasonable expectation for success. The instantly claimed process is therefore patentable over the teachings of Fitton and El Ali, the closest prior art.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

EXAMINER'S AMENDMENT

2. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by

Art Unit: 1621

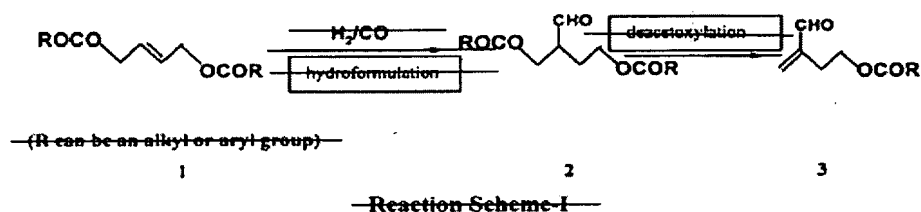
37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Evelyn M. Kwon on June 6, 2007.

The claims have been amended as follows:

Claim 1 has been amended as follows:

An improved process for preparing the esters of γ -hydroxy tiglic aldehydes, said process comprising; hydroformylation of biscoxylic esters of but-2-ene-1,4-diol having the general formula 1, wherein R is C₁ to C₁₂ alkyl or aryl, followed by deacetoxylation of its hydroformylation compound, having the general formula 2, in the presence of organo metallic heterogeneous catalyst, hydrogen, carbon monoxide at elevated temperatures and in presence of solvent to obtain desired Esters of hydroxy tiglic aldehydes having the general formula 3[[]]



Claim 2 has been amended as follows:

Art Unit: 1621

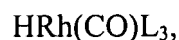
The process as claimed in claim 1, wherein the biscarboxylic esters of but-2-ene-1,4-diols are ~~selected from the group comprising~~ butene-2-diol-1,4-diacetate, butene-2-diol-1,4-diformate, butene-2-diol-1,4-dipropionate, butene-2-diol-1,4-dibutyrate, butene-2-diol-1,4-diisobutyrate, butene-2-diol-1,4-dipalmitate, or butene-2-diol-1,4-diben[[~~-~~]]zoate.

Claim 3 has been amended as follows:

The process as claimed in claim 1, wherein the organometallic heterogeneous catalyst is ~~selected from the group comprising~~ a Rhodium complex anchored, tethered or entrapped on a heterogeneous support.

Claim 4 has been amended as follows:

The process as claimed in claim 3, wherein the Rhodium metal complex ~~having~~ has a general formula



Wherein:

L represents a ligand, ~~characterized by the presence of~~ having at least one heteroatom ~~selected from the group containing~~ of nitrogen, phosphorus, oxygen or a combination thereof[[~~:~~]].

Claim 5 has been amended as follows:

The process as claimed in claim 4, wherein the ligand is ~~used~~ are monodentate or multidentate.

Claim 6 has been amended as follows:

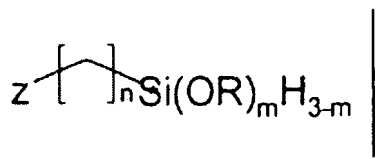
The process as claimed in claim 5, wherein the monodentate ~~ligands are selected from the group comprising~~ ligand is a trialkyl, a triaryl or an arylalkyl phosphinephosphines.

Claim 7 has been amended as follows:

The process as claimed in claim 5, wherein the multidentate ~~ligand is~~ are selected from the group comprising diphenyl phosphino[[,]] methane, diphenyl phosphino ethane, diphenyl phosphino propane, diphenyl phosphino butane, or 2- diphenylphosphino-[N-(2-diphenylphosphino)oxy]ethyl]-N-methyl]-benzamine.

Claim 9 has been amended as follows:

The process as claimed in claim 8, wherein the anchoring agent used ~~[[are]]~~ is a functionalized-alkyl-substituted (Z-[CH₂]_n-) silane containing at least one alkoxy group (-OR) attached to the silicon atom, having a general formula of Z-(CH₂)_n-Si(OR)_mH_{3-m} wherein Z is a functional group ~~[[as]]~~ -NH₂, -SH, vinyl, or allyl[[etc.]], "n" ~~may have~~ has an integral value ~~values~~ between 2 and 6, "m" ~~may have~~ has an integral value ~~values~~ between 1 and 3 and represented by



Claim 10 has been amended as follows:

Art Unit: 1621

The process as claimed in claim 3, wherein the organo metallic complex $\text{HRh}(\text{CO})\text{L}_3$, is tethered on the surface of the heterogeneous support by means of an inorganic heteropoly acid (HPA).

Claim 11 has been amended as follows:

The process as claimed in claim 10, wherein the tethering moiety used for anchoring the transition metal complex to the solid matrix ~~[[are]]~~ is an inorganic heteropoly acid, having the primary Keggin ion structure.

Claim 12 has been amended as follows:

The process as claimed in claim 10, wherein the HPA used ~~[[are]]~~ is phosphotungstic acid ~~[[and]]~~ or phosphomolybdic acid.

Claim 15 has been amended as follows:

The process as claimed in claim 1, wherein ~~the hydrocarbon solvent used are selected from the group comprising~~ is benzene, xylene, toluene, cyclohexane, isooctane, hexane, ~~ethers such as~~ diethyl ether, tetrahydrofuran, ~~[[or]]~~ dioxane, ~~esters such as~~ ethyl acetate, ~~[[or]]~~ methyl propionate; ~~or alcohols such as~~ , methanol or n-butane.

Claim 16 has been amended as follows:

The process as claimed in claim 1, wherein the process is carried out in the presence of carbon monoxide and hydrogen in a volumetric ratio in the range of 1:2 to 2:1~~[[,]]~~.

Claim 18 has been amended as follows:

The process as claimed in claim 1, wherein the reaction is carried out at a pressure in the range of 10-1000 atmospheres.

Claim 19 has been amended as follows:

The process as claimed in claim 18, wherein the reaction is carried out at a pressure in the range of 10-140 atmospheres.

Claim 21 has been amended as follows:

The process as claimed in claim 1, wherein thus obtained esters of hydroxy tiglic aldehydes have a selectivity of about 100%.

The following new claim has been added:

Claim 22: The process as claimed in claim 1, wherein the solvent used is a hydrocarbon, an ether, an ester or an alcohol.


Conclusion

- 3. All questions pertaining to an application that has been allowed should be directed to the Office of Patent Publications Image Assistance Center at 888-786-0101.**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Paul A. Zucker whose telephone number is 571-272-0650. The examiner can normally be reached on Monday-Friday 5:30-3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Johann Richter can be reached on 571-272-0646. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


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AO 1621